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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/678,183	10/02/2000	Daniel A. Schoch	M-193	4840

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EXAMINER	
WEST, JEFFREY R	

ART UNIT	PAPER NUMBER
2857	

DATE MAILED: 12/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO 90C (Rev 10/03)

Office Action Summary	Application No.	Applicant(s)
	09/678,183	SCHOCH ET AL.
	Examiner	**Art Unit**
	Jeffrey R. West	2857

AK

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11,13 and 16-26* is/are rejected.

7)☒ Claim(s) *12,14 and 15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 February 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.

4) ☐ Interview Summary (PTO-413) Paper No(s). _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: .

DETAILED ACTION

1. In view of the Appeal Brief filed on 01 September 2003, PROSECUTION IS HEREBY REOPENED. A new grounds of rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Claim Objections

2. Claims 5, 12, 13, and 16 are objected to because of the following informalities:

In claim 5, line 7, "determining the contact point" should be ---determining a contact point---.

In claim 12, line 2, "calculating the distance" should be ---calculating a distance---.

In claim 13, line 3, "determining the value of static stiffness" should be ---determining a value of static stiffness---.

In claim 16, line 4, "determining the value of static stiffness" should be ---determining a value of static stiffness---.

In claim 16, lines 10-11, "for the relevant point" should be ---for a relevant point---.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> **The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.**

1. Claims 1-4, 6, 20-24, and 26 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 1, 3, 6, 20, and 26 include the limitation of providing/storing an equation which can be used for generating a theoretical slide displacement curve based on the press speed and a plurality of variables corresponding to characteristics of the press. This equation, however, is never provided in the specification. Because the equation is not provided, the specification fails to describe to one having ordinary skill in the art the relationship between the variables and the slide displacement, or the nature in which variables can be represented by values in order to determine the slide displacement curve. It is well-known that an equation provides a specific relationship between the variables contained therein and generating an equation for providing this specific relationship to correctly model the curve desired would

required much experimentation. Therefore, claims 1, 3, 6, 20, and 26 do not clearly describe the method of using the instant invention.

Claims 2, 4, and 21-24 are rejected under 35 U.S.C. 112, first paragraph, because they incorporate and fail to correct the lack of clarity present in parent claims 1, 3, and 20.

Further, with respect to claims 2, 4, 22, and 26, the limitation of determining a variable corresponding to the press drive mechanism is unclear because there is no description of what type of variable, or corresponding unit, could be used in an equation to apply to the drive type of the press.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> **(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.**

3. Claims 5 and 7-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 3,869,927 to Lose et al. in view of U.S. Patent No. 5,997,778 to Bulgrin.

Lose discloses a geared drag link-slider-crank press, and a corresponding method of use, comprising generating a theoretical slide displacement curve for the press, and plotting this slide displacement vs. crank angle (column 7, lines 27-37 and Figure 3), generating an actual slide displacement curve during load conditions

of the press, and plotting this slide displacement vs. crank angle (column 8, lines 21-23 and Figure 4), determining a contact point on the actual slide displacement curve which corresponds to the slide contacting the stock material (i.e. begin work point) (column 1, lines 15-20 and Figure 11), establishing a start point on the slide downstroke between top dead center and the contact point, establishing an end point on the slide upstroke between top dead center and the contact point (i.e. slow points) (column 3, lines 23-31), and identifying and superimposing the points on the theoretical and actual slide displacement curves corresponding to the start point and the end point (Figures 3 and 4). Lose also discloses that the first plot for displaying the actual slide displacement curve and the second plot for displaying the expected theoretical displacement are for comparing the two graphs to indicate the performance of the press (column 8, lines 21-24). Also, as shown by Figures 4 and 11, the contact point is established as a first determined inflection point on the actual slide displacement curve.

While the invention of Lose discloses many of the features of the claimed invention, including comparing an actual slide displacement curve to a theoretical slide displacement curve, and while it could be assumed that the theoretical/expected slide displacement corresponds to "no load" conditions, Lose does not specifically state that the theoretical/expected slide displacement curve be under "no load" conditions or plotting the displacement sensed by a non-contact displacement sensor vs. time.

Bulgrin teaches an auto-tuned, adaptive process controlled, injection molding machine including a user console for inputting a plurality of set points (column 9, lines 30-37), a non-contact position sensor for sensing the position of the slide (column 9, lines 37-40), a non-contact load sensor for sensing the load of the slide (column 9, lines 53-59), and a screen for displaying a "no load" velocity profile superimposed with a corresponding actual velocity profile and the plurality of setpoints to determine the performance of the press (column 6, lines 24-28, column 9, line 64 to column 10, line 8, column 10, lines 35-53). Bulgrin also teaches displaying the press output as velocity vs. displacement (Figure 3A) and displacement vs. time (Figure 8) by relating the two values using a well-known relationship (column 15, lines 15-61).

It would have been obvious to one having ordinary skill in the art to modify the invention of Lose to specify that the theoretical/expected slide displacement curve be under "no load" conditions, as taught by Bulgrin, because, as suggested by Bulgrin, the combination would have allowed the press control system to account for any variation attributed to a specific machine by providing a reference base (column 11, lines 5-16).

Further, it would have been obvious to one having ordinary skill in the art to modify the invention of Lose to include plotting the displacement sensed by a non-contact displacement sensor vs. time, as taught by Bulgrin, because Lose specifically discloses determining variations of the displacement over time periods (Lose, column 7, lines 51-67) and Bulgrin suggest a combination that would have

provided a corresponding method for supplying more detailed information to the time changes of interest without interfering with the operation of the press. Also, since Lose teaches that the crank angle in degrees changes over time, plotting displacement over one stroke cycle would display a functionally equivalent relationship as plotting displacement over time.

4. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lose et al. in view of Bulgrin and further in view of U.S. Patent No. 5,870,254 to Baserman et al.

As noted above, the invention of Lose and Bulgrin teaches all of the features of the claimed invention except for multiplying a determined value of dynamic deflection by a determined value of static stiffness to determine the load on any point of the slide stroke.

Baserman et al. teaches a transducer suspension system comprising a rotary actuator that moves an assembly to position the transducer elements on a plurality of sliders (column 3, lines 52-55) wherein the load on the slider is calculated, inherently at a computational device such as a controller unit or host system (column 2, lines 60 to column 3, line 11), by determining, and multiplying, values of dynamic deflection of an imaginary axis passing through the center of the slider and of static vertical stiffness (column 5, lines 26-31) to insure balanced conditions (column 5, lines 15-24).

It would have been obvious to one having ordinary skill in the art to modify the invention of Lose and Bulgrin to include multiplying a determined value of dynamic deflection by a determined value of static stiffness to determine the load on any point of the slide stroke because the invention of Lose and Bulgrin does describe the application of bending forces on the press (Lose, column 1, lines 44-53) and balancing the loads imposed across the drive device (Lose, column 14, lines 3-26) and the combination would have provided a method for determining the loads on the device to determine if they are balanced at any point in order to aid the operator in insuring correct press operation using a well known relationship between common press parameters (See also U.S. Patent No. Re. 33,783 to Spehrley, Jr. et al., column 2, lines 44-54).

5. Claims 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,484,106 to Schoch in view of U.S. Patent No. Re. 33,783 to Spehrley, Jr. et al.

Schoch discloses mechanical device productivity improvement with usage analysis, management, and implementation methodology for a manufacturing facility comprising implementing a computational device to generate, and plot, a theoretical no load value of slide displacement, generate, and plot, a calculated actual load value of slide displacement corresponding in time to the theoretical no load value of slide displacement, and match the calculated values at a plurality of locations along the slide to determine a plurality of values of dynamic deflection which are then

used, along with a value of static stiffness, to calculate the load on the press at the plurality of locations along the slide (column 5, lines 13-23 and Figure 5).

As noted above, Schoch discloses many of the features of the claimed invention and while the invention of Schoch does disclose calculating the load on the press at any point of the slide stroke using a value of dynamic deflection and a value of static stiffness, Schoch does not teach multiplying the value of dynamic deflection times the value of static stiffness to get the corresponding load.

Spehrley Jr. teaches a document scanning system including a precision drive roll in contact with a bail spring (column 2, lines 22-24) wherein the load on the drive roll is determined as a value of dynamic deflection multiplied by a value of static stiffness (column 2, lines 44-54) and the load is applied substantially across the whole length of the drive roll (i.e. balanced) (column 2, lines 54-58).

It would have been obvious to one having ordinary skill in the art to modify the invention of Schoch to include multiplying the value of dynamic deflection times the value of static stiffness to get the corresponding load, as taught by Spehrley Jr., because the combination would have provided a necessary method for determining the load using a value of dynamic deflection and a value of static stiffness disclosed by Schoch.

Further, the invention of Schoch specifically teaches determining values of dynamic deflection based upon matched load and no-load displacement values and while the invention of Schoch does not specifically disclose determining the values of dynamic deflection as the difference between the load and no-load values, the

Examiner takes Official Notice that it is well-known that dynamic deflection is caused by a difference between load and no-load displacements (see for example U.S. Patent No. 3,885,283 to Biondetti, column 2, lines 44-48).

Also, since Schoch teaches measuring values of load verses time (column 2, lines 57-58) and plotting load verses crank angle (Figure 5) it would have been obvious to one having ordinary skill in the art to plot the load vs time since it is well-known that the crank angle in degrees changes over time and plotting displacement over one stroke cycle would display a functionally equivalent relationship as plotting displacement over time while displaying more detailed information regarding the change in displacement by including times where the press slows (see also, for example, U.S. Patent No. 5,913,956 to Capps, Figure 8).

6. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schoch in view of Spehrley, Jr. et al. and further in view of U.S. Patent No. Re. 34,559 to Mickowski and U.S. Patent No. 5,113,756 to Fujii.

As noted above, the invention of Schoch and Spehrley, Jr. teaches all of the features of the claimed invention except for including a speed sensor for sensing the speed of the press, a non-contact displacement sensor for sensing slide displacement during an actual load condition of the press, and an input means for inputting a plurality of variables corresponding to characteristics of the press to a computational device.

Mickowski teaches a diagnostic method for analyzing and monitoring the process parameters in the operation of reciprocating equipment comprising a microprocessor in communication with a non-volatile memory, input device, display, and transducers (column 3, lines 61-68 and Figure 1) wherein the transducers sense and supply velocity data, that can be representative of time increments (column 6, lines 30-31), to the microprocessor (column 4, lines 1-5) as a function of stroke position (i.e. ram/slide displacement above dead bottom center) during a production cycle (column 4, lines 23-33). Mickowski teaches inputting the velocity data to the microprocessor (column 7, lines 29-37 and 53-56), storing the data to determine the current displacement profile (column 2, lines 51-55) and plotting, on the display, the velocity as a function of displacement and a superimposed theoretical profile in order to compare the actual and theoretical curves at any individual point of displacement (column 4, lines 46-50 and 57-66). Mickowski also teaches obtaining, and plotting, the pressure/load data vs. displacement (column 5, lines 55-60) as well as the displacement vs. each increment of time (i.e. count quantity) in a stroke (column 6, lines 26-31 and column 7, lines 11-18). Mickowski further teaches using the input means for inputting a plurality of variables corresponding to characteristics of the press (column 5, lines 23-32).

It would have been obvious to one having ordinary skill in the art to modify the invention of Schoch and Spehrley, Jr. to include a speed sensor for sensing the speed of the press and an input means for inputting a plurality of variables corresponding to characteristics of the press to a computational device, as taught by

Mickowski, because the invention of Schoch and Spehrley, Jr. does teach determining and plotting the load of a press and Mickowski suggests that the combination would have provided a method for providing more detailed analysis of the press by analyzing a plurality of variables critical to the operation of the press for comparative purposes (column 2, lines 21-26 and 50-55) while taking into account parameters of the individual, specific press that affects the corresponding load (column 5, lines 23-32).

While the invention of Schoch, Spehrley, Jr. and Mickowski discloses determining position data using a sensor attached to a computing device (Mickowski, column 9, lines 1-7), Mickowski does not specifically teach using a non-contact displacement sensor.

Fujii teaches a method for determining and adjusting the die height of a press machine (column 5, lines 54-56) comprising a non-contact sensor that detects the position of a detection body attached to the slider (column 6, lines 9-18) and produces a signal indicating the contact between the slider and the bottom dead point position of the press (column 6, 18-21) as well as the contact between the slider and the top dead point position of the press (column 6, lines 27-31) in order to automatically adjust the die height during the operation of the machine (column 6, lines 32-47).

It would have been obvious to one having ordinary skill in the art to modify the invention of Schoch, Spehrley, Jr. and Mickowski to include specifying that the position data be determined by a non-contact displacement sensor, as taught by

Fujii, because Fujii suggests that the combination would have provided a method for determining the displacement of Schoch, Spehrley, Jr., and Mickowski using a sensor that would not interfere with the motion of the press through contact while still providing accurate measurements of several microns (column 6, lines 9-13).

Allowable Subject Matter

7. Claims 12, 14, and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 12, if corrected according to the suggestion above, would be considered allowable over the cited prior art because none of the cited prior art teaches or suggests, in combination with the other claimed limitations for monitoring performance parameters for a mechanical press, calculating a distance between the theoretical slide displacement curve and the actual slide displacement curve at a plurality of increments on the slide upstroke between the contact point and the end point, calculating initially the sum of the distances between the theoretical slide displacement curve and the actual slide displacement curve at each increment, shifting the actual slide displacement curve, recalculating the sum of the distances between the theoretical slide displacement curve and the actual slide displacement curve at each increment, and repeating the shifting and recalculating steps until the sum of the distances between the theoretical slide displacement curve and the actual slide displacement curve at each increment reaches a minimum value.

Claims 14 and 15 would be considered allowable over the cited prior art because while the invention of Baserman does teach determining values of dynamic deflection and static stiffness to determine values of load along the slide stroke of Lose et al. in view of Bulgrin, and while U.S. Patent No. 3,885,283 to Biondetti, cited below, teaches a press roll comprising a beam that is straight under no load and bends slightly when loaded wherein the amount of bending is the dynamic deflection value (column 2, lines 44-48), thereby suggesting that it is a difference between load and unloaded conditions that cause the dynamic deflection, none of the cited prior art specifically teaches, suggests, or provides suitable motivation for, in combination with the other claimed limitations for monitoring performance parameters for a mechanical press, calculating values of load along the slide stroke of a press using determined values of dynamic deflection and static stiffness, wherein the value of dynamic deflection is determined by measuring the distance along the ordinate between the theoretical no load slide displacement curve and the actual slide displacement curve.

Response to Arguments

8. Applicant's arguments with respect to claims 1-26 have been considered but are moot in view of the new ground(s) of rejection. The following arguments, however, are noted below.

Applicant argues that, with respect to the rejection of claims 1-4, 6, 20-24, and 26 under 35 U.S.C. 112, first paragraph, "a *prima facie* case of non-enablement has not

could not supply the information deemed missing by the Examiner without undue experimentation. . . In the alternative, Appellant submits that undue experimentation is not needed to enable one skilled in the art to practice the invention with respect to the equation for calculating slide displacement as a function of press speed." The Examiner asserts that since equations not only provide what types of conditions affect the value being calculated, but also give a specific relationship between the conditions, the process of generating an equation requires lengthy experimentation to determine a relationship that correctly provides a curve modeling the nominal outcome. For this reason, one having ordinary skill in the art would not be able to derive such an equation without undue experimentation.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

U.S. Patent No. 5,182,935 to Schockman teaches a single reciprocating dynamic balancer for a double action stamping press comprising determining, and plotting, theoretical force (i.e. load) vs. crank angle and slide displacement vs. crank angle (i.e. count quantity) curves based on the speed of the press, the stroke length, connection rod length, and drive connection information (column 4, lines 5-20 and Figures 1, 2, and 6).

U.S. Patent No. 5,099,731 to Eigenmann teaches a multi-stroke punch press with a means for correcting the immersion depth and the length of feed comprising

determining a theoretical design characteristic curve of the depth of the immersion of the tool vs. the velocity of the strokes and comparing the theoretical curve against the actual curve (column 4, lines 24-40) wherein the no-load (column 3, lines 19-21) characteristic curve is determined using the heights of the bearings as well as a dynamic deflection value (column 3, lines 32-48).

U.S. Patent No. 3,885,283 to Biondetti teaches a press roll comprising a beam that is straight under no load and bends slightly when loaded wherein the amount of bending is the dynamic deflection value (column 2, lines 44-48).

U.S. Patent No. 5,913,956 to Capps teaches an apparatus and method for progressive fracture of work pieces in mechanical presses including providing information to a user by plotting force vs. time and displacement vs. time.

U.S. Patent No. 6,523,384 to Schoch teaches a carry through monitor.

U.S. Patent No. 5,847,902 to Clifford, Jr. et al. teaches a head suspension assembly having parallel-coupled load/gimbal springs including determining a value of load based upon values of deflection and stiffness.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey R. West whose telephone number is (703)308-1309. The examiner can normally be reached on Monday through Friday, 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (703)308-1677. The fax phone number

for the organization where this application or proceeding is assigned is (703)308-7382.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

jrw
December 1, 2003

Marc Hoff
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